- Get out notes from Friday

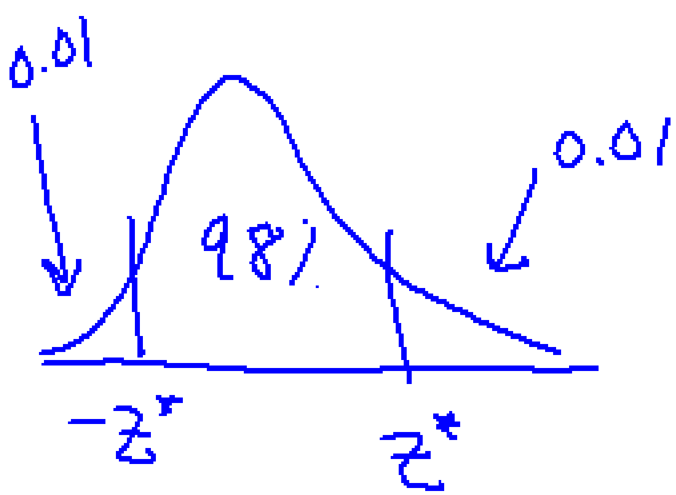
- Warm Up: worksheet 6.1- Confidence intervals from notes Friday. Do #3.

③ a) $\bar{x} \pm z^* \cdot \sigma/\sqrt{n} = (4.6298, 6.0102)$

$\bar{x} = 5.32$
$\sigma = 2.49$
$n = 50$

We are 95% conf that the average drop in heart rate from the drug is btw. 4.6298 and 6.0102 beats/min.

b)



$\boxed{\bar{x} \pm z^* \sigma/\sqrt{n} = (4.5008, 6.1392)}$

* We are 98% conf. that....

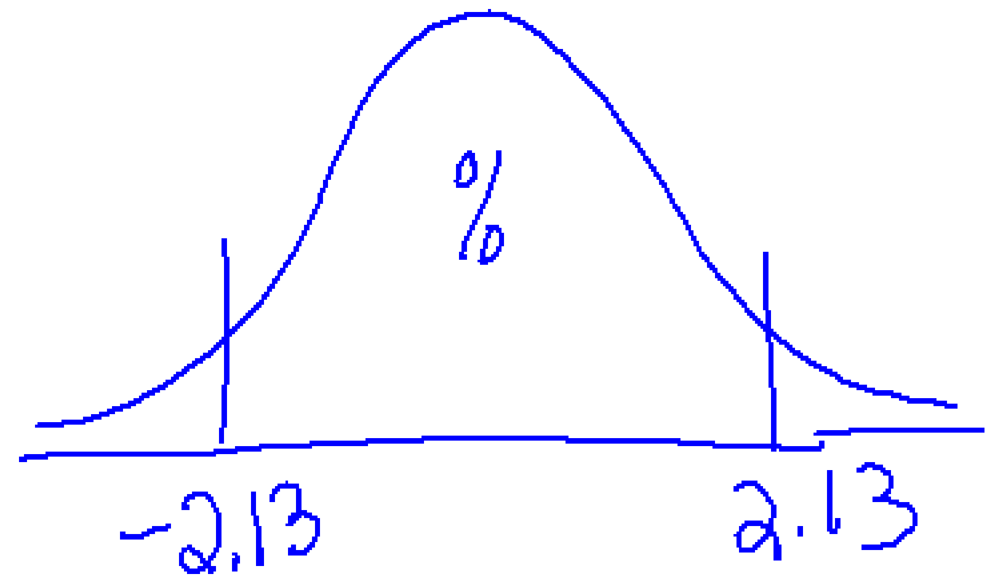
$z^* =$ invnorm(0.01,0,1)
$= 2.326$

$$\bar{x} \pm \boxed{z^* \cdot \sigma/\sqrt{n}}$$

$$0.75 = z^* \cdot \sigma/\sqrt{n}$$

$$0.75 = z^* \cdot 2.49/\sqrt{50}$$

$$z^* = 2.13$$



normcdf(-2.13, 2.13, 0, 1)

96.7%

Assumptions: - must state & check for every problem

μ

STATE	CHECK
• SRS	• circled / assumed
• σ known	• circled
• normal pop. or $n \geq 30$	• circled or $n = 100 \geq 30$ ✓

Choosing Sample size for a certain m.o.e.

- $\bar{x} \pm z^* \cdot \sigma/\sqrt{n}$
- m.o.e.
- $\uparrow n \Rightarrow \downarrow$ m.o.e.
- so that we have a <u>certain</u> moe.
- $m = z^* \cdot \sigma/\sqrt{n}$

*round <u>up</u> n

- fill in all vars but n
- solve for n

$n = 102.1 \Rightarrow 103$

Ex

$m = 2$ lbs.

$C = 95\%$

$n = ?$

$\bar{x} = 190.5$ lbs

$\sigma = 3$ lbs

$m = z^* \cdot \sigma/\sqrt{n}$

$2 = (1.96)(3/\sqrt{n})$

$n = 8.6436 \Rightarrow 9$

wksht #1

$m = z^* \cdot \sigma/\sqrt{n}$

$0.01 = 2.576 \cdot \frac{0.025}{\sqrt{n}}$

$n = 41.4736 \Rightarrow 42$

$\boxed{6.2}$

$P_{RED} = 0.40$

R	B
$\|\|\|$	~~$\|\|\|\|$~~ ~~$\|\|\|\|$~~ $\|\|$

$\hat{p} = \frac{3}{15} = \underline{0.20}$

$\hat{p} = 0.38$

0.35

0.33

0.30

0.25

$P(\hat{p} < 0.20) = \text{normcdf}\left(-E99, 0.2, 0.40, \sqrt{\frac{(0.4)(0.6)}{15}}\right)$

$= 0.057$

- assess the evidence for/against a claim (hypothesis) from sample.

- a sample to a claim (hypothesis)

- expressed in terms of probability.

- Prob. of getting our sample (or something more extreme) if claim is true.

5 steps

a) Assumptions

b) Hypotheses

c) Test Statistic

d) P-value (prob.)

e) Conclusion

u

Hypotheses

- describe the population
- use parameters

Null Hypothesis	Alternative Hyp
Symbol: H_0	H_a

What is it?

claimed to be true / given

What you (the researcher) believes to be true

Form:

H_0: parameter = $\underline{\#}$

$H_0: \mu = \underline{\#}$

H_a: parameter $\overset{>}{\underset{\neq}{<}}$ $\underline{\#}$

$H_a: \mu \overset{>}{\underset{\neq}{<}} \underline{\#}$

Same!

If H_0 is still true, then estimate ($\bar{x}$) is close to claim (μ)

Alt:

one sided: $>$, $<$

two-sided: $\neq$

Test Stat:

- measure the compatability btw $H_0 (\mu)$ & your sample ($\bar{x}$)
- use test stat. for prob. calc.
- z-score Normal R.V. $N(0,1)$
- $z = \dfrac{\bar{X} - \mu}{\sigma/\sqrt{n}}$

$n =$ $z = 1.8$ $z = 2.8$

$z = -0.2$

P-value

Def: the prob. of getting our sample (or something more extreme) if our claim (H_0) is true.

smaller the p-value...
the more evidence against H_0.

P-value:

sample

$P(Z \gtrless \underline{\text{test statistic}}) = \text{normcdf}(LB, UB, 0, 1)$

Use H_a

Sign. level:
value we say is decisive

$\boxed{\alpha = 0.05,\ 0.01}$

5% → if I find a sample that happens less than 5% of time, claim is <u>false</u>

$p = 0.40$

$\hat{p} = 0.38$

0.35

→ 0.32

0.30

→ 0.28

P-value < α

reject H_0